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MISCELLANEOUS FIELD STUDIES MAP MF-1511-A PAMPHLET ACCOMPANIES MAP

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The Irish Wilderness Roadless Area in southeast ouri covers 17,322 acres (7,010 hectares) in the Twain National Forest in northeastern Oregon ty just south of the village of Wilderness (see x map). The study area is most accessible by ty Highway J which partly follows the Oregon and ey County line along the east side of the area. Highway 160 is about 3 mi (5 km) to the south of study area. Good township and county roads form northeast and southern boundaries of the area, and st Service trails, many traversable by pickup or provide excellent access to the study area. The study area is within the Salem Plateau region he Ozark uplift. The heavily timbered, nearly uplands are dissected by narrow, entrenched utaries of the Eleven Point River forming narrow f- and cliff-sided valleys. Numerous small holes and a few caves, typical of karst graphy, exist in and near the study area. Maximum of the area and along County Highway J in the heast corner. The maximum topographic relief is t 450 ft (140 m). those nearby wilderness areas lead contents are an order of magnitude higher than in the Irish Wilderness Roadless Area and molybdenum is not detected. Except for a few high values, the quantity of metals within the stream-concentrate samples in and marginal to the study area show a high degree of homogeneity. A few sites have anomalous concentrations of zinc, nickel, cobalt, and copper, but a meaningful pattern of metal distributions and abundances at the surface, which would indicate favorable ground for deep metal discovery, could not be recognized.

Because the iron oxides and their associated trace metals are derived from formations including, and younger than, the Ordovician Gasconade Dolomite, these 35 samples of stream sediments cannot effectively evaluate the mineral potential of the underlying Cambrian Bonneterre Formation, which is considered to be the most favorable host for lead deposits in southeast Missouri.

Recently released geochemical data from a drill hole several miles north of the study area suggest that if significant mineral deposits are present beneath the area, they could be in the upper Bonneterre Dolomite, but are more likely to be in the Derby-Doerun or Potosi Dolomites, which overlie the Bonneterre Formation. Further drill-hole data are needed to determine the significance of the analytical results from the released drill hole with respect to lead, silver, copper, and other associated metals in the underlying formations of the study area.

Because the Viburnum-Trend type of ore deposits are among the most important to the nation and southeast Missouri (Economic Geology, 1977, p. 337-490), the primary emphasis of the geophysical investigation was an assessment of the possibilities for and detection of deeply buried, large base-metal deposits containing lead, zinc, silver, copper, and cobalt in the Bonneterre Formation. A secondary emphasis was to determine the potential for iron and copper deposits associated with Precambrian lithology and structure as delineated by geophysical data. An aeromagnetic survey of the study area was made by the U.S. Geological Survey in early 1980 (Moss, in press); the acquired information provided the foundation for all of the geophysical interpretations presented here. For reference purposes, an independent interpretation of the survey data was obtained under contract from a commercial organization. This interpretation (Spector, unpubdata, 1980) has been used to augment the work of Moss.

Depth soundings using electromagnetic and resistivity techniques were made at several sites within and adjacent to the study area (Moss, in press). The objective of the electromagnetic survey, so that an assessment of potential for Viburnum-type deposits could be made. However, adverse geologic conditions resulted in interpretations of only marginal accuracy for the purpose needed.

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The Viburnum-type lead-zinc-silver deposits are d in the lowest carbonate formation (Bonneterre ation) of a thick section of Cambrian sediments rests unconformably on an irregular Precambrian ment surface. The section has been subjected to odes of uplift and subsidence, but it has been slightly tilted in the study area. Areas in hasement elevations were above the Lamotte h-out and provided a base for deposition of shore facies of the Bonneterre Formation are most rable for Viburnum-type deposits. The fault zone sion favorable for this type of lead-zinc-silver sits.

The pattern of basement elevations shown by the points are sparse. Four elevation points on the newst border of the study area indicate that the rlying basement there has an elevation of ximately 1,600 ft (490 m) below sea level. This ation might be considered "normal" for the region, a significant thickness of both the Lamotte stone and Bonneterre Formation would be expected the drill-hole section as a model. A sequence stone and sonneterre Formation of approximately if (240 m) below sea level at the east border. Liately north of the northwest quarter of the variation of approximately in this case having an average area, a set of three elevation points indicates are basement high, in this case having an average area and an indicately 350 ft (110 m) below sea

level.

In a qualitative sense, the results of the electromagnetic soundings suggest that depths to the Davis Formation and the basement become shallower going from west to east in conformance with the electromagnetic results are ambiguous regarding the trend from south to north.

The depth interpretations in total indicate a basement relief of anomalous magnitude within the study area. Pinch-outs of the Lamotte Sandstone appear likely within the area along lines projected northward and eastward from the southwest border.

This conclusion is valid even if the upper limit of the Lamotte pinch-out is, in reality, substantially shallower than the extrapolated depth of 1,290 ft (388 m) below sea level.

The aeromagnetic interpretations support the conclusion that certain basic geologic conditions favorable to the occurrence of Ylburnum-type deposits are present within the study area.

Preliminary estimates place the potential host rocks at a depth between 1,500 and 2,000 ft (460 and 610 m). Because of the nearly 2,000-ft depth, the use of geophysical methods was not believed feasible for consequently, geophysical procedures followed an indirect aptroach designed to determine whether favorable, unfavorable, or preclusive geologic conditions for these deposits exist in the study area.

The true elevation of the Precambrian basement surface is known from a drill hole approximately 2.5 mid (4 km) north of the study area (Moss, in press). The drill-hole information indicates that beds of the Lamotte (as well as the Bonneterre Formation) may be expected in the area wherever the basement elevation is lower than approximately 1,400 ft (430 m) below sea the lower than approximately 1,400 ft (430 m) below sea the bear of the Frecambrian basement. This is based on prior observations that the igneous rocks of the basement have much stronger magnetic properties than do the overlying sediments (Alligham, 1976). To a modest degree, the aeromagnetic data must also contain effects produced by relief in the basement

EXPLANATION

US Bureau of Mines sam

Drill Hole

County highway J

Outer margins of buried I zone, and of shattering a Paleozoic rocks at the su

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city Dolomite (Lower ICIAN)--Light- to dark-gray, ve-bedded dolomite with white nodules. Partly weathered to a uum of poorly consolidated, ed mixture of red clay, white, and red-brown, partly dissolved ite; locally a little sand. Found st upland surfaces where ground percolating through the layers of tone and dolomite has dissolved emoved much of the carbonate from rson City Dolomite. Thickness s up to 110 ft (33 m) FORMATION (LOWER ORDOVICIAN)-bedded sandstone and gray cherty ite. Dolomite tends to weather o that characteristic exposures onspicuous massive sandstone salong higher parts of valley. Weathers to reddish residuum ining abundant sand grains, tone blocks, and irregular chunks ert. Maximum thickness about 220 i6 m)
DOLOMITE (LOWER ORDOVICIAN)--bedded, light-brownish-gray, ve dolomite; locally sandy. About (20 m) is exposed, finely calline and contains sparse, white, c-gray, or light-brown chert in a dolomite beds

The U.S. Geological Survey and the U.S. Bureau of ines made a mineral and geological survey of the rish Wilderness Roadless Area (hereafter referred to s the "study" area), southeast Missouri, in 1975-1. The study area covers 17,322 acres (7,010 ectares) in the Mark Twain National Forest in ortheastern Oregon County.

The study area is in the southern part of the alem Plateau region of the Ozark uplift, and contains imbered uplands bounded by the valley of the Eleven oint River on the west side. Within the area are everal narrow valleys that drain southward into the leven Point River. Exposed rocks in the area are early flat lying dolomites and sandstones of rdovician age that show a total structural drop of bout 10 ft (3 m) from the northwest to southeast. hese Ordovician strata are underlain by about 2,000 t (610 m) of mostly dolomitic carbonate sedimentary ocks of Late Cambrian age and some beds of older amotte Sandstone which lie on a distinctly irregular urface of Precambrian igneous rocks.

There is no known record of mineral production, evelopment, or prospecting within the study area, lthough some exploration holes have been drilled eyond the east and north fringes of the area. One rospect for iron ore has been made in the NM1/4 sec. 8, T. 24 N., R. 2 W., within a private property

ement as indicat Dotted lines s of wide fault The study area is located on the southern upper flank of the Ozark uplift. The three rock units exposed are dolomites and sandstones of Ordovician age (see map) which throughout the area appear to be flat lying, but actually have a very gentle southerly dip from northwest to southeast. These rocks are underlain by essentially flat lying sedimentary rocks of Ordovician and Cambrian ages and by basement rocks of Precambrian age having an uneven erosional surface. Although the Precambrian and Cambrian rocks do not crop out in the study area, they are exposed in the Eminence Hills about 30 mi (50 km) to the north, and they have been identified in drill holes near the north and east sides of the area. In descending order, the exposed geologic units in the study area are as follows: Quaternary alluvium as valley fill, residuum derived from weathering of the Ordovician Jefferson City Dolomite, Ordovician Roubidoux Formation (both sandstone and dolomite), and the upper part of the Ordovician Gasconade Dolomite. The subsurface units are the remaining minimum of 200 ft (60 m) of Gasconade Dolomite, about 300 ft (90 m) of Cambrian Potosi Dolomite, 300 ft (90 m) of Cambrian Davis Formation (mostly dolomitic shale), 450 ft (140 m) of Cambrian Bonneterre formation, 0-500 ft (0-150 m) of Lamotte Sandstone, and Precambrian gneiss and granite, thickness unknown.

The surface geologic structure in the study area is fairly simple. The strata have a very gentle southerly regional dip in this part of the Ozark upilift, having a structural relief of about 10 ft (3 m) from the northwestern part to the southeastern part of the study area. The only other surface feature, besides small sinkholes and caves, is the surface expression of a 1.4-mi-(2.2-km-) wide northeaster trending fault zone in the Precambrian basement (see map). Surface strata contain evidence (brecciation) of only slight shearing. Brecciation of surface strata more or less parallels the fault zone in the Precambrian basement (see map). Surface at a depth of about 1,600 ft (490 m). In addition, a sharp southwest bend in the Eleven Ponth River is present a short distance southwest of the northwestern edge of the study area (shown on map), which suggests that this bend follows the sheared zone.

Deeply buried Precambrian hills of felsic igneous composition extend into the study area from three sides (see index map) as shown by the geophysical studies of hoss (in press). The largest area of buried hills that underlies the area extends from the southeast corner of the study area to the west and northwest and almost to the southeast edge of the fault zone noted previously. East of the study area if the study area on the Precambrian paleosurface that is centered about 0.5-1 mi (0.8-1.6 km). A third area of hills extends into the northeast part of the study area about 0.5-1 mi (0.8-1.6 km). A third area of hills extends into the northeast part of the study area if the prevailing northwest wind direction during of the interprets the electromagnetic anomaly as trong and the interprets the electromagnetic anomaly as caused by a Precambrian dake which in part intruded and dilated the fault zone.

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